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ABSTRACT

Rorschach's use of inkblots as a diagnostic tool has been quite useful in aiding in the diagnosis of schizophrenia. In developing his Comprehensive System for the Rorschach, John Exner (1974) included an index designed to identify schizophrenic subjects. The Schizophrenia Index has evolved to reflect ongoing research. In its current state, the five criteria of the Schizophrenia Index include eight variables that are postulated to relate to two areas of schizophrenic disturbance: disordered thinking and inaccurate perception. Both of these have been well supported by empirical data. The accuracy of the Schizophrenia Index is well documented, having a hit rate of approximately 80% with false positives averaging slightly over 6%. The Index could be improved, especially by limiting false positives by the affective disorders. It would also be helpful to have agreement on how to define schizophrenia and to compare schizophrenic subtypes and groups such as borderline and schizotypal personality disorders. Some research suggests that schizophrenics yield reliably different scores on popular and human content responses than do non-schizophrenics. The accuracy of the Schizophrenia Index might be improved by including these measures. In addition, there is a need for replication of the results of Exner and his colleagues and a need for access to unpublished studies done by Rorschach Workshops. Despite its limitations, the Schizophrenia Index continues to be a useful tool in the diagnosis of schizophrenia. (NB)

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THE USE OF THE RORSCHACH TO IDENTIFY SCHIZOPHRENIA: A REVIEW OF THE LITERATURE

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THE USE OF THE RORSCHACH TO IDENTIFY SCHIZOPHRENIA: A REVIEW OF THE LITERATURE

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for the Degree of Doctor of Psychology

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BIOLA UNIVERSITY

DAVID NELSON ENTWISTLE

1986

THE RORSCHACH AND THE IDENTIFICATION OF SCHIZOPHRENIA:

A REVIEW OF THE LITERATURE

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ABSTRACT

In developing his Comprehensive System for the Rorschach, John Exner (1974) included an index designed to identify schizophrenic subjects. The Schizophrenia Index has continued to be developed since that time. Exner and Weiner (1982) and Exner (1986b) have provided theoretical models explaining why the index works. In addition, Exner (1986b) provides information about the accuracy of the Schizophrenia Index. While these contributions have been helpful, there is a need for a review of the literature on the Schizophrenia Index by someone outside of Exner's Rorschach Workshops. Such a review is presented here. This review argues that the Schizophrenia Index is well supported empirically and that it has been explained well conceptually. However, it is noted that it could be further improved, especially in limiting false positives from the affective disorders. An analysis of Exner's (1985a) Rorschach data is reported which suggests specific variables which could potentially increase the accuracy of the Schizophrenia Index.

The Use of the Rorschach to Identify Schizophrenia: A Review of the Literature

The Rorschach Inkblot test continues to be one of the most popular tests in clinical psychology. While it has many uses, perhaps the most vital is its ability to aid in the diagnosis of schizophrenia. Although there has been a fair amount of research on this topic, there have not been any attempts to review this literature. This paper will synthesize some of the historical and empirical literature on the use of the Rorschach in diagnosing schizophrenia and will attempt to provide a conceptual framework to explain why it works. On a more specific level, it will also address the validity of the Exner (1974) Comprehensive System's Schizophrenia Index.

The need for a review of this literature is two-fold. First, no one independent of Exner's Rorschach Workshops has attempted a formal review of this data. It is important for this research to be reviewed in order to evaluate what parts of the Schizophrenia Index have good empirical support and which are less adequately supported. Second, there are several difficulties associated with this type of research which have not been presented elsewhere and which may have implications for the interpretation of Rorschach results in the clinical diagnosis of schizophrenia.

History of Rorschach Usage with Schizophrenia

Hermann Rorschach (1884 - 1922) never intended to invent the test that bears his name, nor was he the first to see that responses to inkblots might express something about the respondent. In fact, ink blots had been used as a game long before Rorschach saw any clinical potential for their use.

A game called Klecksographie (or Blotto) had been played in Europe for nearly 100 years before Rorschach began using inkblots as a research instrument. In playing Blotto, one looked at an inkblot and used it to write poetry, play charades, or specify what the blot looked like (Exner, cited in Weiner, 1983). The game was even played in schools as a competition sport, much like debate teams today. Hermann Rorschach´s early interest in inkblots was a result of this game: There is some thought that he might have been the captain of his school Blotto team (Exner, 1986a)!

Rorschach was not the first to think of using inkblots as a psychological tool. Binet and Henri had thought to use inkblots in the measurement of intelligence and other researchers were interested in using them to study imagination and creativity (Exner, cited in Weiner, 1983). In fact, Rorschach´s diagnostic use of inkblots evolved quite by accident.

The Rorschach evolved as an accident in research on schizophrenia. Konrad Gehring, a teacher who was a friend

of Rorschach, used the game as an incentive for his school students to do their work. Rorschach apparently sought to use the game as a patient management tool on the schizophrenic ward where he worked. What he noticed, though, was that the schizophrenics seemed to respond differently to the game than most people did. At first he did nothing with this information, but several years later he decided to study this phenomenon.

Rorschach made inkblot templates by placing ink on paper and pressing it between the two halves when it was folded over. This produced roughly symmetrical figures. Eventually ten of these were selected as the test stimuli and responses to them were collected and systematized based on the diagnoses of the subjects.

The results of Rorschach's approach were surprisingly useful. As Dr. Rorschach wrote in Psychodiagnostics,

> Originally this method [the presentation of inkblots to elicit responses] was used exclusively as an approach to theoretical problems. The discovery that the results could be used in making diagnoses was an empirical finding which had not been looked for. . . . After a further period of development it should be possible in almost every case to come to a definite conclusion as to whether the subject is normal, neurotic, schizophrenic, or has organic brain disease. Even now it is possible to arrive at a clearly differentiated diagnosis in most patients, and at a specific personality diagnosis in neurotics and normals. (Rorschach, 1921, p. 120)

One of the most useful aspects of the test was in the identification of schizophrenics: "In the first place, it often, and eventually will perhaps always, make possible a

differential diagnosis between neurosis and latent or manifest schizophrenia" (Rorschach, 1921, p. 123).

By the time his Psychodiagnostics was published in 1921, it was already quite clear that Rorschach had devised a method which had great utility in aiding in the diagnosis of schizophrenia as well as in identifying other personality characteristics. Unfortunately, Herman Rorschach had not completed his research on his "Form Interpretation Test" prior to his premature death due to appendicitis. Nonetheless, the work that he completed before his death continues to provide an important part of the basis for our current understanding of the Rorschach.

After Rorschach's death in 1922, several conflicting systems of Rorschach interpretation developed for the test which now bears his name. Major problems ensued when conflicting Rorschach systems developed, most of which focused more on clinical application than good research methodology. Not until John Exner began to study the five major systems, to establish the empirical validity of the various approaches, and to develop his Comprehensive System, did the Rorschach begin to overcome its limitations in terms of lack of research and conflicting approaches. [For a more extensive history of the Rorschach, see John Exner's chapter on the Rorschach Test in I. Weiner (1983) and the Introduction in J. Exner (1986b).]

Most of the recent Rorschach research has utilized the Exner Comprehensive System. However, there are still

researchers using other approaches. Therefore, this review is not limited to studies using Exner´s system, but care must be taken in interpreting data that measures the relevant concepts differently. In addition, the Exner Comprehensive System continues to be altered as new research is done, so changes within that system also make a review of the literature difficult. Before proceeding to a review of this research, though, a discussion of schizophrenic disorders is in order.

Schizophrenia: Disorder and Diagnosis

The development of the Rorschach is very much related to early research on schizophrenic diagnosis. In fact, Bleuer´s work on schizophrenia was influential on Rorschach´s "experiment"; he was one of Rorschach´s professors and even directed his doctoral thesis before Rorschach´s interest in the diagnostic use of inkblots developed. To better understand the use of the Rorschach in diagnosing schizophrenia, it is necessary to examine the conceptualization of that disorder.

As was seen in the previous section, the history of the Rorschach test involved many different approaches to interpreting the results. A similar problem occurred in schizophrenia research. A few decades before Hermann Rorschach died, Kraepelin was formulating the first system to differentiate schizophrenia (dementia precox) from other

psychoses. In the first half of this century, Bleuer coined the term schizophrenia to refer to people who had loose associations; flat, blunt, or inappropriate affect; autistic detachment from reality; and ambivalence. From this point onward, several diagnostic conceptualizations of schizophrenia developed, making systematic research and diagnosis difficult. These differences are reflected both in diagnostic nomenclature and in research criteria for operationally defining schizophrenia.

Goldstein (1985) points out that there are striking differences in defining schizophrenia between the first two Diagnostic and Statistical Manuals and the current DSM-III; the first two define it as a disorder with disturbances of thought, affect, and behavior while the latter defines it according to six symptoms (bizarre delusions, non-persecutory or non-jealous delusions, persecutory or jealous delusions with hallucinations, auditory hallucinations, incoherence or loose associations), deterioration in functioning, duration of symptoms for at least six months, no depression or mania that is not clearly secondary to schizophrenia, onset prior to age 45, and the absence of organicity. Goldstein (1985) concludes, "The diagnosis of schizophrenia remains as difficult and controversial as ever" (p. 150) and that

> DSM-III should be accepted as only one system, among many, for making the diagnosis of schizophrenia. It does not provide construct validity, it identifies only the most chronic schizophrenics, it does not provide either genetic or psychodynamic understanding, and it implies therapeutic nihilism. When one evaluates a

> patient for schizophrenia, DSM-III should be consulted but not considered the final word. (p. 150)

Thus the diagnosis of schizophrenia is made difficult by the lack of agreement on how to define the disorder.

This difficulty is further exacerbated by more recent questions about whether paranoid disorders should be included within the schizophrenic spectrum. The researcher, then, is confronted by having to differentiate thought disorders, non-schizophrenic psychoses, and paranoid disorders from the already ambiguous classification of schizophrenia.

Ambiguous though the issue may be, an operational definition must be advanced in order to perform research on schizophrenia. In clinical practice this diagnosis is often based on the DSM-III (American Psychiatric Association, 1980) criteria already mentioned. There are also several other research instruments used to operationalize the definition of schizophrenia. These also differ among themselves in the symptomatology used to denote the disorder (Goldstein, 1985). With this diagnostic confusion, it becomes necessary to look at a researcher's criteria for identifying schizophrenic subjects.

Due to the importance of this issue, it is imperative to examine how schizophrenia has been operationalized in the Rorschach research pertaining to this diagnostic category. In addition, it is necessary to look at how the researchers conceptualize schizophrenia and how they postulate that it will be reflected on the Rorschach.

Conceptual and Empirical Understanding of Rorschach Diagnosis of Schizophrenia

The lack of agreement over how to define schizophrenia highlights the difficulty involved in this type of research. In order to evaluate this research on empirical grounds it is necessary to understand how the researchers operationalize and conceptualize schizophrenia, and how they postulate that its symptomatology is evident in the Rorschach.

Although some studies fail to report how they identified schizophrenic subjects for inclusion in their schizophrenic reference groups, most have relied on criteria from the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1980, 1968, 1952) and Spitzer, Endicott, and Robbin's Research Diagnostic Criteria (1978). These methods appear to have established a standard approach to identifying schizophrenic subjects. A broader issue, though, involves the researcher's conceptualization of how schizophrenia will be reflected in the Rorschach.

Exner and Weiner (1982) note that "schizophrenia can best be conceptualized for purposes of psychodiagnostic assessment as a breakdown in certain cognitive, interpersonal, and integrative functionings of the personality" (p. 212). They suggest that these impairments

are displayed by disordered thinking, inaccurate perception, interpersonal ineptness, and inadequate controls.

Exner (1986b) explains how the Rorschach can be used to differentiate schizophrenic from non-schizophrenic symptomatology:

> Although listings of features of schizophrenia sometimes differ sharply in length and/or content, almost all include a reference to four basic characteristics - inaccurate perception, disordered thinking, inadequate controls, and interpersonal ineptness. There are several Rorschach variables that relate to these features, either directly or indirectly. However, none of these variables is exclusive to schizophrenia.... But no group, other than schizophrenia, has been defined or conceptualized as having both the problems of disordered thinking and inaccurate perception. (p. 418, emphasis in original)

Exner and Weiner (1982) demonstrate how these characteristics (inaccurate perception, disordered thinking, inadequate controls, and interpersonal ineptness) are displayed in several Rorschach variables. As noted in the above quotation, Exner (1986b) suggested that the most relevant of these characteristics for identifying schizophrenia involve disordered thinking and inaccurate perception. Exner (1986b) includes the measures of interpersonal ineptness that Exner and Weiner (1982) discussed under the heading of disordered thinking. In his discussion of the Schizophrenia Index, Exner reviewed some of the research related to its variables. However, neither Exner and Weiner (1982) nor Exner (1986b) review several other variables which are not included in the Schizophrenia Index but which are thought to relate to this disorder.

Following Exner (1986b), this paper will review the research on the two elements of schizophrenic impairment (disordered thinking and inaccurate perception) which are considered to be primary in diagnosing schizophrenia and which are measured by the Comprehensive System's Schizophrenic Index. The two following sections will describe specific elements of the schizophrenic disorder as conceptualized by Exner (1986b), review the available research that relates to that variable, and demonstrate how the Rorschach measures this. A third section will address the accuracy of the Schizophrenia Index. Its strengths and limitations will then be reviewed and suggestions for further research offered. As a reference, Table 1 on the following page lists the Schizophrenia Index variables. Following that, Table 2 defines Rorschach variables that will be use in the following discussion.

Disordered Thinking

Disordered thinking is comprised of incoherent, illogical, and inappropriately abstract thinking. According to Exner and Weiner (1982), disordered thinking is displayed in the Rorschach through a dissociated response style, unusual verbalizations, and abstract preoccupation. Exner (1986b) suggests that the Rorschach scores for unusual verbalizations (Special Scores) and human responses that are of poor form quality are related to disordered thinking. In

Table 1

Variables in the Schizophrenia Index

1.	X+% < .70
2.	Sum FQ- > Sum FQu or X-% > .20
3.	M- > 0 or WSUM6 > 11
4.	Sum DV + DR + INCOM + FABCOM + ALOG + CONTAM > 4
5.	Sum DR + FABCOM + ALOG + CONTAM > Sum DV + INCOM or M- > 1

Note. From A Rorschach Workbook for the Comprehensive System (p. 56) by J. Exner, 1985a, Bayville, New York: Rorschach Workshops. Copyright 1985 by J. Exner. Adapted by permission.

Table 2

Definitions of Rorschach Variables

Variable	Definition
X+%	A variable related to perceptual accuracy, calculated as the sum of good form quality responses divided by the total number of responses.
X-%	A variable reflecting perceptual distortion, calculated as the number of minus form quality responses divided by the total number of responses.
FQ-	The "distorted, arbitrary, unrealistic use of form" in which the response is not congruent with the blot features (Exner, 1985, p.31).
FQu	Uncommon responses which are easily seen and which do not violate the blot features.
M-	The number of human movement responses in the record which have a minus form quality.
WSUM6	A sum of six special scores, weighted as follows: DV x 1, DR x 3, INCOM x 2, FABCOM x 4, ALOG x 5, and CONTAM x 8. (The more serious types of cognitive slippage are given greater weight in this derivation.)
DV	Responses which include neologisms (using a word incorrectly or using a made-up word) or redundancies (e.g., a pair of two objects).
DR	Responses which include either inappropriate phrases or circumstantial responses.
INCOM	Incongruous Combination - the condensation of blot details merged into one object (e.g., a four-legged chicken).
FABCOM	Fabulized Combination - an unlikely relationship is posited between two objects (e.g., a chicken playing basketball).

Table 2 (Continued)

Variable	Definition
ALOG	Inappropriate Logic - strained logic which is used to justify a response. (e.g., "It must be a chicken because it's crossing the road.")
CONTAM	Contamination - two or more images that have been fused in an unrealistic manner (e.g., a frog-chicken).

Note. Table 2 compiled based on definitions given by Exner (1986b, 1974).

this section, the Special Score variables relating to disordered thinking will be reviewed, followed by a review of the variables relating to distorted human content responses.

The Exner Comprehensive System includes several "Special Scores" which reflect different types and severities of cognitive slippage. Six of these -- Deviant Verbalizations (DV), Deviant Responses (DR), Incongruous Combinations (INCOM), Fabulized Combinations (FABCOM), Contaminations (CONTAM), and Inappropriate Logic (ALOG) -- are believed to relate to disordered thinking.

Two of the Comprehensive System´s Special Scores relate to unusual verbalizations. The first of these is called Deviant Verbalization (DV) and refers either to neologisms (incorrectly using a word or making up one) or redundancies. The second is called Deviant Responses (DR) and indicates responses that use inappropriate phrases or circumstantial responses.

Three of the Comprehensive System´s Special Scores relate to inappropriate combinations of blot details. Incongruous Combinations (INCOM) involve the inappropriate merger of separate images into one object (e.g., a four-legged chicken). Fabulized Combinations (FABCOM), on the other hand, involve an unrealistic relationship being posited between two or more objects, such as "a chicken playing basketball." The third type of inappropriate combination is the Contaminated response: CONTAM represents

two or more impressions being fused together in an unrealistic manner: "a frog-chicken."

A final indicator of disordered thinking in the Comprehensive System is Inappropriate Logic (formerly called "Autistic Logic," hence the abbreviation "ALOG"). This represents very strained, unconventional attempts to justify a response without prompting. An example of this would be "It must be a chicken because it´s crossing the road."

This cursory summary is not intended to be an exhaustive introduction to the Special Scores but is intended to provide a basic introduction for those unacquainted with the Rorschach. (For a more detailed explanation of the special scores, see Chapter VII in Exner, 1985a.)

The Schizophrenia Index includes three measures that make use of the aforementioned indicators of disordered thinking. (See Tables 1 and 2.) These are: (a) WSum6 > 11, a weighted sum of the six Special Scores, which is scored as significant if equaling more than eleven points, (b) Sum DV+DR+INCOM+FABCOM+ALOG+CONTAM > 4, simply the presence of more than four indicators of disordered thinking in a protocol, and finally (c) Sum DR+FABCOM+ALOG+CONTAM > Sum DV+INCOM, indicating that the more severe indicators of disordered thinking were more prevalent than the less severe ones.

Not all studies involving disordered thinking in Rorschach responses have utilized the Comprehensive System,

but most of the studies have supported the general notion that schizophrenics tend to express these more than non-schizophrenic controls. Several of Exner's studies suggest that these responses are relatively uncommon and reflect various elements of thought disorders.

One problem in reviewing Exner's studies is that many are unpublished and are not made available by Rorschach Workshops. According to Leon Martin of Rorschach Workshops (personal communication, March 31, 1986) the studies listed as unpublished are "project director reports" of results and analyses. Mr. Martin reports that the specific studies I inquired about were analyses of a schizophrenic sample which resulted in a decision to collect a larger sample and that the new edition of The Rorschach: A Comprehensive System, Volume I, (Exner, 1986b) describes the development of the Schizophrenia Index thoroughly. This still leaves the problem that one is forced to rely on citations and summaries of these studies. Since most of these summaries focus on the results rather than the methodology, it is difficult to critique them. Nevertheless, the studies are a major source of data on the development and validity of the Schizophrenia Index.

Exner (1978) reported that Exner, Wylie, and Kline (1976) were able to construct a scale that accurately differentiated schizophrenics from non-schizophrenic controls at a high hit rate with few false positives or negatives. Unfortunately, the reported study was not

published and Exner's (1978) reference to it does not give enough details to review it adequately. Other studies, however, have been done that support Exner's contention.

Exner and Murillo (1977) studied two groups of schizophrenics treated with either Electroconvulsive Shock Therapy (N = 28) or drugs (N = 16) and compared their Rorschach responses to those of normal subjects (N = 25). One of their findings relevant to this discussion of disordered thinking was that normal subjects gave significantly fewer indications of disordered thinking ($p < .05$) than either of the treated schizophrenic groups.

Weiner and Exner (1978) compared 1,570 Rorschach records drawn from a pool of protocols maintained by Rorschach Workshops. The draw included Rorschachs from 325 non-patient adolescents, 345 adolescents referred for evaluation of behavior problems, 180 withdrawn adolescents, 325 non-patient adults, 185 outpatient adults, and 210 from inpatient schizophrenics. The subjects had been drawn from a stratified random sample that approximated demographic variables of the 1970 U.S. census. Relevant to the current concern, the study found that four of the Special Scores (DV, ALOG, INCOM, FABCOM) were significantly more common in the schizophrenic group at $p < .001$ and that CONTAMS were more common at the .05 level. At the time this study was done there was no distinction made between DV and DR, so all five of the indicators of disordered thinking reliably differentiated schizophrenic from non-schizophrenic groups.

Saccuzzo, Braff, Sprock, and Sudik (1984) compared 20 inpatient non-schizophrenics with 20 inpatient schizophrenics based on MMPI and Rorschach data. MMPI results could not differentiate between the two groups reliably. It was found that Rorschach DV responses occurred significantly more often in schizophrenic patients ($p < .05$) and WSum6 approached significance at $p < .08$ with schizophrenics again scoring higher. Although this study found less profound differences, its trend does support the notion that Rorschach indices of disordered thinking are more prevalent in schizophrenic than non-schizophrenic groups. The small sample size may explain why the results were less significant than other studies reported.

One of the earliest studies of deviant verbalization in Rorschach responses was done by Rapaport (1946), but it was plagued with several methodological problems. Schuldberg and Boster (1985) reanalyzed these data and controlled for several prior deficiencies by removing some questionable comparison groups. Plots of the Delta Index scores indicated that deviant verbalizations fell into two categories: 1) personal assignment of meaning and 2) a rigid response set or cognitive control of scanning, both of which are reflective of a thought disorder.

A study comparing the Rorschachs of 155 schizophrenic, 102 depressives, and 186 nonpatient subjects found several significant differences among the three groups (Mason, Cohen, & Exner, 1985). Of interest here is that the

schizophrenic subjects had significantly higher Sum of Special Scores than did depressives, who had significantly more than did normals, all at the $p < .01$ level of significance. The Sum of Special Scores is not weighted, as is WSUM6, but it is comprised of the same variables.

In a study designed to evaluate the response process of schizophrenic and normal individuals, Colligan and Exner (1985) found that schizophrenics given the Rorschach tachistoscopically were differentiated from normals only by giving more Special Scores (Sum of 5 Special Scores, DV, and ALOG) indicating cognitive slippage. This study raises interesting questions about the accuracy of perception in schizophrenia and will be discussed in the next section involving perceptual accuracy in schizophrenia. The importance of the study for the current discussion, though, is that it confirmed that disordered thinking of schizophrenic subjects is demonstrated in unusual verbalizations.

In summary, then, there is evidence from several studies indicating that schizophrenics tend to produce more responses to the Rorschach that indicate disordered thinking than do non-schizophrenic subjects. As opposed to normal subjects, schizophrenic subjects tended to give more Deviant Verbalizations (Colligan & Exner 1985; Exner & Murillo, 1977; Saccuzzo, Braff, Sprock, & Sudik, 1984; Schuldberg & Boster, 1985; Weiner & Exner, 1978), more ALOG's (Colligan & Exner, 1985; Weiner & Exner, 1978), more of the the Special

Scores INCOM, FABCOM, and CONTAM (Weiner & Exner, 1978), and Sum of Special Scores (Colligan & Exner, 1985; Mason, Cohen, & Exner, 1985; Saccuzzo, Braff, Sprock, & Sudik, 1984). These variables are thought to be reflective of disordered thinking and are significantly more common in schizophrenic than non-schizophrenic Rorschach responses.

As was mentioned at the beginning of this section, Exner (1986b) also related human content with distorted form quality to disordered thinking. Exner and Weiner (1982) had originally conceptualized this as a separate aspect of schizophrenia which they called "interpersonal ineptness."

Poor social skills and withdrawal are characteristics of the schizophrenic disorder which are thought to relate to disordered thinking and which are reflected on Rorschach variables. Exner and Weiner (1982) note that the Rorschach picks up on this through the clinician´s contact with the client, inadequate M (Human movement), and inadequate H (Human content). Of these three, the Schizophrenia Index incorporates only the second element. The validity of using inadequate human movement as a part of the Schizophrenia Index will now be considered. Following that, some research on inadequate human content will be reviewed, citing implications for identifying schizophrenics.

As indicated on Table 1, two variables on the Schizophrenia Index relate to the presence of human movement responses which have minus form quality: M- > 0 and M- > 1.

As can be seen on Table 1, both of these variables are included in the Index in combination with other variables, for example "M- > 0 OR WSUM6 > 11." The importance of including M- in this manner will be discussed following a review of the research on this variable.

Few articles have been reported that look specifically at the presence of M- responses. One that does is reported by Exner, Thomas, and Mason (1985). In this study, 29 schizophrenic adolescents were tested at first admission and again 11 to 14 months later and compared on five Rorschach variables which have been found to relate to schizophrenia (X+%, X-%, Sum Special Scores, Weighted Sum of 5 Special Scores, and M-). Of these, all had test-retest correlations above .75 except for the M- variable (.72). This study demonstrates that this variable is somewhat stable, but it does not give us any information about its prevalence in relation to normal subjects' Rorschach responses.

Exner (1974) reviews a few studies from the 1950's and early 1960's that looked at M- responses, stating that this variable may be indicative of psychosis. He then reports that in the 1974 reference sample, M- responses occurred in only 6 of 200 nonpsychiatric protocols, 18 of 100 out-patient records, 17 of 70 non-schizophrenic in-patient records, and 48 of 125 schizophrenic records.

This variable of the Schizophrenia Index seems to be somewhat empirically supported in that few non-schizophrenics give M- responses. However, even in Exner's

(1979) reference sample only 48 of the 125 schizophrenics (38.4%) had M- responses. Therefore, M- responses would seem to identify only a minority of the individuals with that diagnosis; it yields very few false positives, but it only identifies about 38% of the true positives.

Since it is a good discriminating variable if present in a record, it was desirable to include this in the Schizophrenia Index. The drawback would of course be a loss of true positives on this variable. In an apparent attempt to solve this problem, the M- response was included in the index as one of two variables, either, but not both, of which load on the Schizophrenia Index. (See Table 1.) In that way, the M- response can still be used to identify probable schizophrenic subjects without the resulting large number of false negatives that the variable would tend to yield by itself.

Another relevant variable that is not included in the Schizophrenia Index is human content responses. This variable has received only limited attention in the literature to this point. One study that specifically addressed this issue proposed that the human content expressed in a Rorschach reflects the level of the subject's object relations (Lerner & St. Peter, 1984). In this study human content was scored based on accuracy, differentiation, and content. It was found that schizophrenics could be differentiated from non-schizophrenic subjects without even breaking the results down to accurate versus inaccurate

responses. (Unfortunately, they do not specify how they differentiated the groups but they are apparently referring to the total number of human content responses.) When the results were broken down into accurate and inaccurate responses, Lerner and St. Peter found that they could differentiate between neurotic, outpatient borderline, inpatient borderline, and schizophrenic protocols. The schizophrenics tended to give fewer and less accurate human responses than other groups. This study offers a good preliminary look at the human content response as a variable which could aid in the diagnostic utility of the Rorschach, especially in differentiating schizophrenic from non-schizophrenic profiles. Nevertheless, the study employed a new scoring method that needs further development and has not been replicated. It does suggest that further research on the human content of Rorschach responses might be profitable and that it could potentially be a valuable addition to the schizophrenia index.

In summary, the human movement response with poor form quality (M-) has been shown to be a variable that produces few false positives but with a large loss of the true positives in identifying schizophrenic subjects. This problem seems to have been overcome by including the M- response with other variables which reduces the false negatives. Exner (1986b) believed that this element related to disordered thinking. Exner and Weiner (1982) also suggested that schizophrenics tend to have inadequate human

content on the Rorschach. Preliminary research by Lerner and St. Peter (1983) on human content suggests that this might be a variable that could increase the accuracy of the Schizophrenia Index. However, more research is needed on human content before this can be done.

Exner (1986b) points out that disordered thinking alone does not indicate schizophrenia, though it does indicate a thinking problem like that in schizophrenia. To differentiate true schizophrenics from others with thought disturbances (e.g., schizotypal and affective disturbances), the index includes variables that relate to perceptual inaccuracy as well as disordered thinking. The Schizophrenia Index variable relating to distortions in perception will now be examined.

Inaccurate Perception

Inaccurate perception involves distorted perception and poor reality testing. It is reflected in the Rorschach by poor form quality and fewer than normal "populars." Of these, the only one included in the Schizophrenia Index is poor form quality. This is the critical variable in identifying schizophrenia; two of the Schizophrenia Index variables relate to form quality. Although populars are not included on the schizophrenia index, some preliminary research has been done which will be reviewed.

There are two types of form quality measures on the Rorschach. The first of these involves percentages that reflect the accuracy or inaccuracy of the form quality in the record (F+%, X+%, X-%), while the second involves determining whether there are more minus form quality responses or unusual form quality responses (FQ-, FQu). (See Table 2 for definitions.) These two types of form quality measures will be defined and, following that, a review of the research on them will be presented.

The percentages relating to perceptual accuracy or inaccuracy are F+%, X+%, and X-%. F+% involves the form quality of only pure form responses. Since there may be few pure form responses in a record it is less accurate than the other two measures (X+% & X-%) which relate to all of the responses in a record. Therefore, F+% is excluded from the Schizophrenia Index but X+% and X-% are included (Exner, 1986b).

The first of these two, X+% < 70, "concerns perceptual accuracy for the total record" (Exner, 1985a). To calculate this amount, the protocol is first scored for the quality of the form used in all of the responses. This means that the percept given by the subject is scored of "good" form quality if it was in response to a Whole or Common Detail (D) area of the blot which was reported by 150 (2%) or more of the norm group of 7,500 protocols, which had a total of 162,427 responses. If the area was an Uncommon Detail (Dd) and at least 50 subjects responded to the area, it is judged

to be of good form quality if 2/3 of those responding reported the percept (Exner, 1985a). The X+% score is derived by counting the number of good form quality responses in a protocol and dividing it by the total number of responses.

The other measure of overall form quality on the Index is X-% > .20, that is, the percentage of minus form quality responses in the record exceeded twenty percent This variable has only recently been added, so little research is available on it. Exner (1986b) explains that:

> The X-% represents the proportion of uncommon responses in the record that disregard the appropriate use of the contours of the blots. These are the answers in which the objects specified are, at best, very difficult to see, and in many instances are impossible to find. In effect, they are violations of reality (p. 368).

By definition, such responses are extremely rare and are difficult for someone other than the respondent to see.

As already mentioned, the second type of form quality measure on the Rorschach involves determining whether there are more minus or unusual form quality responses. This is derived as "Sum FQ- >= Sum FQu" which means that there are more minus form quality responses (those that are very rare and do not conform to the blot features) than unusual ones. Having defined these variables, the research on them can now be examined.

Exner (1985a, 1978, 1972) has reported reference data on nonpatients and several psychiatric groups. However, in none of these cases has he reported the between-groups statistical significance for the data. Although the

statistical significance is not reported, it is possible to calculate it since he supplies means, standard deviations, and number of subjects for each group. Results of t-tests derived from his data are reported in Table 3.

Although Exner (1985a, 1978, 1972) does not report the significance of these data, it can be clearly seen that the X+% score was much lower than the scores of the controls. In my analysis of his 1985 data, the schizophrenic group had significantly lower F+% ($p < .01$), X+% ($p < .001$), and Populars ($p < .001$), and significantly higher X-% ($p < .001$), and FQ- ($p < .001$) scores than either depressive or normal groups. More specific information is available in other studies such as the ones that follow.

In a long term follow-up of schizophrenics treated with drugs or electroconvulsive treatment (ECT), Exner and Murillo (1977) found that, following treatment, the schizophrenic subjects displayed significantly lower X+% and F+% scores than normals and also displayed more indicators of disordered thinking. The study did not compare pre and post treatment scores for the schizophrenics, but it does demonstrate that perceptual accuracy was distorted in the schizophrenic subjects, a result that is even more profound since this finding took place following treatment.

In another study (Exner, Armbruster, & Mittman, 1978) five groups of 20 subjects each, including one schizophrenic group, were directed to give as many responses to the Rorschach templates as possible in one minute. All the

Table 3

Pairwise Comparisons of Selected Rorschach Variables

	t VALUES: NORMAL vs. SCHIZOPHRENIC	*t* VALUES: NORMAL vs. DEPRESSED	*t* VALUES: SCHIZOPHRENIC vs. DEPRESSED
R	14.433 ***	15.423 ***	1.996 *
P	26.832 ***	13.291 ***	-8.413 ***
FQ+	9.718 ***	6.995 ***	-1.286
FQo	49.370 ***	25.842 ***	-13.973 ***
FQu	4.136 ***	2.145 *	-1.301
FQ-	-50.340 ***	-17.044 ***	20.278 ***
M-	-22.252 ***	-4.204 ***	11.970 ***
FC´+C´F+C	------	-17.764 ***	-15.121 ***
FV+VF+V	-2.092 *	-9.518 ***	-6.094 ***
3r+(2)/R	0.788	2.490 *	1.357
Col-Sh Bl	-1.458 *	-5.434 ***	-3.310 ***
X+%	11.364 ***	4.786 ***	-4.358 ***
F+%	6.821 ***	2.026 *	-3.203 **
X-%	-12.405 ***	-4.474 ***	4.992 ***
Pure H	8.062 ***	10.736 ***	3.213 **
All H	-2.707 ***	8.343 ***	8.000 ***
DV	-12.464 ***	-3.246 **	7.291 ***
DR	-8.534 ***	-1.359	5.678 ***
INCOM	-13.302 ***	-4.917 ***	5.545 ***
FABCOM	-21.101 ***	-5.634 ***	10.285 ***
ALOG	-13.628 ***	-2.408 **	7.488 ***
CONTAM	-5.242 ***	0.547	3.687 ***
SUM 6 SP C	-40.232 ***	-12.269 ***	19.029 ***
WSUM 6	-86.031 ***	-22.325 ***	38.133 ***
MORBID	-3.187 **	-31.056 ***	-21.127 ***
SCZI	-55.347 ***	-19.721 ***	21.745 ***
DEPR	-5.404 ***	-30.893 ***	-23.400 ***

Note. Sample sizes: Normal = 600, Depressives = 210, Schizophrenic = 320. Raw data from A Rorschach Workbook for the Comprehensive System by J. Exner, 1985a, Bayville, NY: Rorschach Workshops.

* $p < .05$, two-tailed
** $p < .01$, two-tailed
*** $p < .001$, two-tailed

subject groups maintained good form quality except for the schizophrenic group ($p < .05$).

In Mason, Cohen, and Exner's (1985) study of schizophrenic, depressive, and normal subjects, they found that the schizophrenics had the lowest X+% scores (.52), and that depressives also had low X+% scores (.68) compared to normal subjects (X+% = .83). In pairwise comparisons of the three groups, the schizophrenic group demonstrated significant differences ($p < .01$), scoring lower on this variable than either of the other groups.

An interesting question stimulated by these Rorschach findings is whether schizophrenics actually perceive things inaccurately, or if in processing their perceptions they become distorted. Colligan and Exner (1985) presented the Rorschach tachistoscopically to normal and schizophrenic subjects, reasoning that if the issue is one of inaccurate perception the form quality would be poor for schizophrenic subjects despite the brief exposure time, whereas if the difficulty was one of processing, then the brief exposure and response time would result in good form quality. They found that all groups in their study of normal and schizophrenic subjects had good form quality responses when the Rorschach is presented tachistoscopically, suggesting that it is not that schizophrenics perceive more poorly than normals but that they do not screen out the poor form responses.

A final question involves the permanency of perceptual inaccuracy. In their eight year longitudinal study (beginning with 8 year old normals) Exner, Thomas, and Mason (1985) found that the only stable Rorschach variable from age 8 to 16 was form quality. In other words, the level of perceptual accuracy tends to be stable even at early ages over long periods of time while no other Rorschach variable showed such stability. This suggests that the deficit in perceptual accuracy which is reflected in the Rorschach is a relatively permanent trait.

Finally, Exner (1986b) and Exner and Weiner (1982) suggest that inaccurate perception is reflected in the Rorschach by fewer than normal populars. In two studies with adequate sample sizes, schizophrenics were found to give fewer popular responses than other groups. In Exner, Armbruster, and Mittman's (1978) study, inpatient schizophrenics gave significantly fewer populars than nonpatient adults, nonpatient children, or inpatient depressives ($p < .05$). Mason, Cohen, and Exner (1985) also report that schizophrenics gave fewer popular responses than depressives or nonpatients ($p < .01$).

Although there are only a few studies that have investigated popular responses on the Rorschach, it appears that schizophrenics do score significantly lower on this variable than other groups. As Table 3 shows, my analysis of Exner's (1985a) data indicates a highly significant difference on this variable, with schizophrenics having

fewer populars than either non-patient or inpatient depressive groups ($p < .001$). This could be a variable which might improve the accuracy of the Schizophrenia Index if added to it.

Taken together, these studies tend to support Exner and Weiner's (1982) contention that inaccurate perception is reflected in the Rorschach in poor perceptual accuracy (low X+% and high X-%, more FQu and FQ-) and in fewer than normal populars. These deficits in perceptual accuracy, while not unique to schizophrenia, are one of the factors that is manifest in this disorder. While schizophrenics do tend to give fewer popular responses to the Rorschach, this variable is not currently a part of the Schizophrenia Index. This warrants further research since it could potentially improve the discriminatory power of the Schizophrenia Index.

As has been seen, the Rorschach indices of distorted perception that are included in the Schizophrenia Index have received empirical support. As Exner (1986) points out, though, neither disordered thinking nor inaccurate perception alone adequately differentiate schizophrenia from other disorders. While both of these have been empirically supported in differentiating schizophrenics from non-schizophrenics, it is only when they are found in conjunction that they tend to rule out other disorders which may be elevated on one or the other element. A question that follows from this is, "How accurate is the Schizophrenia Index in identifying schizophrenia?"

The Accuracy of the Schizophrenia Index

The research reviewed here has generally supported the claims that several Rorschach variables relate directly to elements of the schizophrenic disorder, namely that the Schizophrenia Index variables are capable of reflecting the disordered thinking and inaccurate perception characteristic of schizophrenia. A remaining question about the validity of the Schizophrenia Index variables is the accuracy of the Index in diagnosing Schizophrenia -- identifying true positives while avoiding false positives and false negatives.

The Comprehensive System's Schizophrenia Index, while fairly good, is still being developed and improved by Rorschach Workshops. In their Alumni Newsletter dated August 8, 1985, the following information was presented:

> It [the Schizophrenia Index] works reasonably well, but we would still like to improve it. In an exercise for the new Volume 1 we made six random draws of 100 records each from our schizophrenia pool of over 1000 cases. At each draw we also randomly selected 400 other records, 100 each from nonschizophrenic outpatients, nonschizophrenic inpatients, affective disorders, and nonpatients to use as controls. In the six draws, the SCZI correct rate for schizophrenics, that is, having a value of 4 or 5, ranged from a low of 72 out of 100 to 87 of 100. False positives appeared in all of the control groups except one draw of nonpatients. The highest number of false positives occur among the affective disorders, ranging from 12 in one draw, to 5 in another. If the positive criterion is restricted to an SCZI value of 5, the false positive rate is reduced sharply, excluding all nonpatients, and including only 5 of the 600

> outpatients, 6 of the 600 nonschizophrenic inpatients, and 12 of the 600 affective disorders. But the trade-off is the loss of 40% of the true positives. (p. 11)

In its current state of development, the Schizophrenia Index is a reasonably accurate instrument, but an imperfect one to be sure.

Exner (1986b) reports that a "Monte Carlo" random draw of 100 patients each from Schizophrenic, Nonschizophrenic Outpatient, Nonschizophrenic Inpatient, Affective Disorders, and Nonpatient records from the pool of records kept by Rorschach Workshops was performed to evaluate the accuracy of the Schizophrenia Index.

Exner found that the correct hit rate was between 72 and 87 percent (average = 79.67% over six draws) when a cutoff of four positive Schizophrenia Index variables was established and that false positives never exceeded ten percent in any of the draws for any of the comparison groups.

Although the accuracy of the Index is best shown by "Monte Carlo" studies in which correct and incorrect hit rates can be calculated, it can also be demonstrated that it accurately differentiates schizophrenic from groups. In my analysis of Exner's (1985a) data, schizophrenics scored significantly higher on the Schizophrenia Index than either nonpatients or depressives. (See Table 3.)

Unfortunately, the studies on the accuracy of the Schizophrenia Index have not been subjected to replication studies. While the studies done by Rorschach Workshops seem

very well done it would be desirable to have them replicated by an independent research project. This is not likely to occur since the task of collecting the volume of data that would be needed is an ominous task.

General Discussion

It would be unrealistic to expect the instrument to be perfect, since our diagnosis of disorders is itself imperfect. In its current state, the Schizophrenia Index works fairly well, but it could still be improved. In discussing its current status and further refinements which may improve its accuracy, its strengths and weaknesses will be examined and suggestions for further research will be offered.

Strengths of the Schizophrenia Index

Considerable research has gone into the development of the Schizophrenia Index by John Exner and his colleagues at Rorschach Workshops. Their dedication can be credited with much of its success. The major strength of the Index as a whole is that it works fairly well; a correct hit rate of 79.67 percent with relatively few false positives (average across four groups = 6.08) is one of the biggest strengths of the Schizophrenia Index. Another strength is that it has

been provided with a good conceptual basis by Exner and Weiner (1982) and Exner (1986b).

Of the individual variables that make up the index, most have received adequate empirical support. The individual variables that have been reviewed have each done a fairly good job at differentiating schizophrenic from non-schizophrenic disorders. Together, though, these variables tend to reduce the false positives since they combine elements of disordered thinking and inaccurate perception, two characteristics which are found in combination together only in schizophrenia.

Limitations of the Schizophrenia Index

One of the things that makes research on schizophrenia difficult is the lack of agreement on how to define the disorder. It is not surprising that this issue limits the accuracy of any instrument that tries to identify schizophrenia, and the Rorschach is no exception. Despite this problem, the Schizophrenia Index still seems to be an adequate instrument.

While the Index is fairly accurate, it still has more false positives than would be desirable. Every instrument will yield some false negatives and false positives but one hopes to reduce both as much as possible. Some research has suggested that schizophrenics may differ on at least two variables that are not included in the Schizophrenia Index

(Populars, Human Movement). These are areas in which further research could readily be performed to evaluate the efficacy of including them in the Index as it is further developed.

A final limitation of the Index is that no research has been addressed to the issue of schizophrenia subtypes or the idea of a schizophrenic spectrum. At the very least, it would be helpful to compare schizophrenic subtypes and groups such as borderline and schizotypal personality disorders. Presently, this has not been attempted.

Suggestions for Further Research

As noted above, there has been some research that suggests that schizophrenics yield reliably different scores on Popular and Human Content responses than do non-schizophrenics. Schizophrenic and non-schizophrenic groups were significantly different on these two variables in my analysis on Exner's (1985a) data as reported in Table 3. If future studies replicate previous findings in this area, it may be possible to improve the accuracy of the Schizophrenia Index by including these measures.

Secondly, little or no research has addressed schizophrenic subtypes or disorders that fall in the schizophrenic spectrum. Studies on these two areas are needed to clarify whether the index can differentiate between these categories.

Finally, Exner (1986b) notes that many of the false positives that occur on the Schizophrenia Index come from the affective disorders. Perhaps a way of limiting these false positives would be to screen out those with features of an affective disorder. The Comprehensive System already has a Depression Index which is designed to identify affective disorders. It includes five items: FC'+C'F+C' > 3, FV+VF+V > 0, 3r+(2)/R < .30, Color-Shading Blend > 0, and MOR > 3. In my analysis of Exner's (1985a) data on Table 3, it can be seen that all of these except for 3r+(2)/R differentiate between the Inpatient Schizophrenic and the Inpatient Depressive groups at $p < .001$. (There was no significant difference on the other variable between these two groups.) Utilizing some of these variables in the Schizophrenia Index might potentially be a way of limiting false positives and warrants further investigation.

Summary and Recommendations

Hermann Rorschach's experiment with using ink blots as a diagnostic tool has been surprisingly useful, especially in aiding in the diagnosis of schizophrenia. Recent attempts to develop a Schizophrenia Index for the Comprehensive System began with Exner (1974) and are continuing to be improved through ongoing research. In its current state, the five criteria of the Schizophrenia Index include eight variables that are postulated to relate to two

areas of schizophrenic disturbance: disordered thinking and inaccurate perception. Both of these have been well supported by the empirical data. The accuracy of the Schizophrenia Index is well documented, having a hit rate of approximately 80 percent with false positives averaging slightly over six percent. The false positives can be limited by increasing the criterion level to five out of five, but this then restricts the correct schizophrenic hit rate considerably. Further research is being done to address the problem of false positives (Exner, 1985b).

Suggestions for improving the Index have already been made in this paper. A final suggestion concerns the need for replication of the results of Exner and his colleagues and the need for access to unpublished studies done by Rorschach Workshops. Of the nine studies reviewed here, only three were not authored or co-authored by Exner. It is obvious that further replication is desirable but it is also obvious that this kind of research is immensely difficult, especially in collecting data. One possible solution to this problem would be for Exner to allow independent researchers to use the data pool kept by Rorschach Workshops. However, this confronts us with another problem: Rorschach Workshops will not release their unpublished studies, so they would not be likely to allow others to use their data pool either. It would be beneficial for researchers independent of Rorschach Workshops to be able to

review its findings and use its pool of collected data, but it remains to be seen if either will become a reality.

Nonetheless, the Comprehensive System's Schizophrenia Index has received careful research and development from John Exner and his colleagues at Rorschach Workshops. Several of its variables have received some independent research attention although more is needed. Despite its limitations, the Schizophrenia Index continues to be a useful tool in the diagnosis of schizophrenia, having been well researched empirically and explained conceptually.

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